

NOTES ON THE DISTRIBUTION OF SOME LEGUME SPECIES IN ARUNACHAL PRADESH

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ABSTRACT

The present paper discusses distribution of 18 species from the family *Leguminosae* that shows interesting distribution pattern in Arunachal Pradesh. *Acrocarpus fraxinifolius* Wight & Arn., *Caesalpinia decapetala* (Roth) Alston, *Cassia hochestetteri* Ghesq., *Crotalaria anagyroides* Kunth, *Dalbergia thomsonii* Benth., *Desmodium zonatum* Miq., *Flemingia involucrata* Benth., *Hylodesmum podocarpum* (Candolle) H. Ohashi & R.R. Mill., recorded for the first time for the state. The occurrence of *Adenanthera pavonina* L., *Crotalaria humifuga* Graham ex Benth., *Erythrina arborescence* Roxb., *Indigofera pseudo-reticulata* Grierson & D.G. Long, *Derris marginata* (Roxb.) Benth., *Desmodium laxiflorum* DC., *Mucuna imbricata* DC. ex Baker, *Shutteria involucrata* (Wall.) Wight & Arn., and *Trifolium repens* L., *Uraria lagopodioides* (L.) Desv., recorded as extended distribution from adjacent states or phytogeographic region.

Key words: New records, distribution, Arunachal Pradesh, Leguminosae.

INTRODUCTION

The family Leguminosae with 627 genera and over 19,347 species (Lewis & al., 2005) is the third largest family of flowering plants, next to Orchidaceae and Asteraceae. The species of this family are found throughout the world, growing in different climatic conditions. In terms of economic importance Legumes are next to the family *Poaceae* in providing food crops for world agriculture (Harborne, 1994). Many agricultural crops viz., *Arachis hypogaea* L. (Peanut), *Cajanus cajan* (L.) Millsp. (Pigeon Pea), *Cicer arietinum* L. (Chickpeas), *Glycine max* L. (Merr.) (Soybean), *Lens culinaris* Medic. (Lentil), *Phaseolus vulgaris* L. (Common beans), *Pisum sativum* L. (Field pea), *Vicia faba* L. (Faba bean), *Vigna radiata* (L.) Wilcz. are the best known grain legumes which provide vegetable protein to mankind. Members of this family are also used as forages, green manures and for a variety of purposes. International Legume Database & Information Service (ILDIS), Reading University and Royal Botanic Garden, Kew, is working towards maintaining the information on the occurrence, distribution and usage pattern.

In India the family Leguminosae (*s.l.*) is represented by 179 genera and 1152 species (Sanjappa, 1991). While in Arunachal Pradesh, it is the second largest family next to Orchidaceae (Baishya, 2001). Chowdhery & al., (1996) enumerated 64 genera and 196 species; Sharma & al., (2002) reported 158 species of legumes from West Kameng district of Arunachal Pradesh. Dash (2010) reported 74 genus and 218 species from Arunachal Pradesh. The occurrence of the *Astragalus donianus* DC. *Astragalus tribulifolius* Benth. ex Bunge, *Astragalus xiphocarpus* Benth. ex Bunge was reported by Chaudhary (2003, 2005).

Arunachal Pradesh being part of the eastern most limit of Himalaya serves as the centre of geographic distribution and differentiation of many legume species (Ohashi, 1978). Taxonomic research and general plant exploration in Arunachal Pradesh by different workers resulted many interesting aspects of the flora of the state. The floristic accounts of the state/region were published from time to time; most noteworthy being *On the Botany of Abor expeditions* by I.H. Burkill (1924-1925); *Botanical expedition in the Mishmee hills* by Kingdon Ward (1929-1931); *Lohit valley* by Kingdon Ward (1953); *A sketch of the vegetation of Aka hills* by N.L. Bor 1938. Many exploration were conducted by scientists of Botanical Survey of India (Rao 1955-59; Panigrahi & Naik, 1961; Panigrahi & Joseph, 1966; Rao & Joseph, 1965; Sahni, 1969, Chauhan & al., 1996; Pal, 1993; Dash, 2010, 2011). This was taken up primarily towards preparation of the state flora

of Arunachal Pradesh. The materials for the flora of Arunachal Pradesh published in three volumes (Chowdhery & al., 1996; Giri & al., 2008 & Chowdhery & al., 2009) gives the baseline floristic composition of the state. Field studies have yielded interesting results in the context of recorded distribution many plants. While studying the specimens deposited in ASSAM, ARUN and CAL herbaria, the author came across eighteen plants of family Leguminosae, which had hitherto not recorded for the state or depicting a interesting distribution pattern. These eighteen plants enumerated below with their citations, correct nomenclature, a short description, phenology and a short note on the occurrence of the species in Arunachal Pradesh.

1. *Acrocarpus fraxinifolius* Wight & Arn., Mag. Zool. Bot. 2: 547.1838; Baker in Hook. f., Fl. Brit. India 2: 292. 1876. (Leguminosae-Caesalpinioideae)

Large deciduous trees, 20 - 35 m high, bark dark-brown, scaly; branchlets densely lenticellate. Leaves evenly bipinnate, 50 - 60 cm, pinnae 2 - 4 pairs, with a odd terminal one; leaflets 6 - 10 pairs, ovate-lanceolate or oblanceolate, 5 - 12 × 2 - 6 cm, base rounded or cuneate, entire, apex acuminate, glabrous above, sparsely pubescent beneath. Inflorescence terminal racemes, rachis up to 25 - 40 cm long, densely flowered, pedicels 2 - 4 mm. Calyx 5-lobed, sepal triangular or deltoid, 3 - 5 × 1.5 - 3 mm, pubescent, inserted on a receptacle cup. Petals yellowish, red-tipped, oblanceolate, 8 - 12 × 1 - 2 mm, pubescent. Stamens exserted, 15 - 20 mm long; filaments reddish. Ovary linear, stipitate. Pods 10 - 15 × 1 - 2 cm, narrowly winged on the lower sutures, seeds 15 - 20, ellipsoid.

Fl. & Fr.: January - March

Distribution: Rarely found in the sub-tropical and broadleaved forests; 300-1000 m.

Specimen examined: West Kameng District: Pagala forest, A.S.Rao s.n., (ASSAM).

Notes: The species is found in the sub-tropical terai and warm broad leaved forests of Himalaya. In north-eastern states the species is recorded from Assam, Meghalaya, Mizoram and Sikkim. The collection of A.S.Rao from Pagla forest represented by a single specimen and forms the basis for the first report of its distribution in Arunachal Pradesh. The plant is useful as its leaves are used as fodder; wood used for furniture. The plant is extensively planted as avenue plantation in other parts of country and has a great potential for introduction in Arunachal Pradesh.

2. *Adenanthera pavonina* L., Sp. Pl. 384.1753. (Leguminosae-Mimosoideae)

Medium sized trees, 4 - 15 m high, stem unarmed. Leaves bipinnate, pinnae even pinnate; common rachis 15-30 cm long; leaflets 3 - 5 pairs, ovate-oblong, 2 - 4 × 1.3 - 2 cm, base rounded, apex obtuse and emarginated, sparsely pubescent on both surfaces. Inflorescence axillary or terminal racemes. Calyx campanulate, 5 lobed; sepals c. 1 mm long, pubescent on outside. Petals bright yellow or orange, 2 - 3 mm across, elliptic. Stamens 10, filaments 3 - 5 mm long, anthers with an apical gland. Pods linear, curved or coiled on maturity, 12 - 20 × 1 - 1.5 cm, compressed between the seed; seed 10 - 15, bright red, and glossy.

Fl. & Fr.: June - December.

Distribution: Rarely found in wild, cultivated in the Chessa Botanical Garden and CRPF campus.

Specimen examined: East Kameng District: Chessa Botanical Garden, S.S.Dash 31252 (ARUN).

Notes: The species is reported (Anonymous, 1992) to be cultivated/naturalized in warmer parts of the country, including the northeastern states of Assam, Meghalaya and Sikkim. No collection of the species from wild is recorded in Arunachal Pradesh, except for few plants cultivated in the Chessa Experimental Botanical Garden of East Kameng district and in CRPF campus, Senkie View, Itanagar. The species is widely cultivated for its timber. The red heartwood of the plant is also used as a substitute for red sandal wood. (Anonymous 1992). This species has a great potential for avenue plantation in Arunachal Pradesh.

3. *Caesalpinia decapetala* (Roth) Alston in Trimen, Handb. Fl. Ceylon Supp. 6: 89.1931; Santapau & Wagh, Bull. Bot. Sur. India 5: 108.1974. *Reichardia decapetala* Roth, Nov. Pl. Sp. 212. 1821. *Caesalpinia sepiaria* Roxb., Fl. Ind. 2: 360.1832; Baker in Hook. f., Fl. Brit. India 2: 256. 1878. (Leguminosae: Caesalpinioideae).



Plate 1. **A.** *Adenanthera pavonina* L., **B.** *Crotalaria anagyroides* Kunth; **C.** *Dalbergia thomsonii* Benth, **D.** *Desmodium laxiflorum* DC.; **E.** *Hylodesmum podocarpum* (Candolle) H Ohashi & R R Mill, **F.** *Trifolium repens* L.

Medium sized climbing shrubs, branchlets with recurved spines, densely pubescent with brown hairs. Leaves 10 - 30 cm, pinnae 3 - 10 pairs, 3 - 6 cm long; leaflets membranous, 5 - 12 pairs, oblong or obovate, 1 - 2 × 0.5 - 1 cm, base rounded, entire, apex obtuse and emarginated, glabrescent above, pubescent and minutely glandular beneath. Flowers in elongated racemes, peduncles 15 - 30 cm long, sparsely pubescent; pedicels 10 - 30 mm long, jointed near apex. Calyx 9 - 12 mm long, pubescent, lower sepals hooded, other oblong. Petals yellow with red stripes; obovate, 10 - 15 × 8 - 12 mm, clawed at base. Stamens c. 15 mm long, filaments densely woolly towards the base. Pods woody, oblong, 7 - 20 × 2 - 2.5 cm; narrowly winged along the upper suture, sharply beaked at apex, seeds 4 - 9.

Fl. & Fr.: June - September.

Distribution: Common in the moist areas and river banks of sub-tropical forest; 900 - 1800 m.

Specimen examined: West Kameng District: Tanga, K.P.Singh 101500 (ASSAM).

Notes: *Caesalpinia decapetala* (Roth) Alston is distributed in Western Himalaya, Peninsular region, Gangetic plains, Nepal and Bhutan. Occurrence of the species in the north eastern region was so far not been recorded. The occurrence of this species in the Tanga area of West Kameng district of Arunachal Pradesh establishes an eastern extension of the species from Bhutan and its first record for north east India. The species is morphological similar to *Caesalpinia enneaphylla* Roxb. and can be differentiated by the absence of recurved spines in the stem and laxly arranged flowers in racemes.

4. *Cassia hochstetteri* Ghesq., Bull. Jard. Bot. Brux. 9: 155.1932; Singh, Bull. Bot. Surv. India 18: 87.1979. *Senna dimidiata* Buch.-Ham. ex Roxb., Fl. Ind. 2: 352.1832. *Cassia mimosoides* L. var. *dimidiata* (Roxb.) Baker in Hook. f., Fl. Brit. India 2: 266. 1878. (Leguminosae: Caesalpinioideae).

Herbs, woody at base, stem prostrate, 10 - 40 cm high. Leaves 4 - 6 cm long; leaflets oblong-lanceolate, 3 - 10 × 1 - 2 mm, base rounded or oblique, entire, apex acute and mucronate; midrib closer to the upper margin; glabrous, petioles 2 - 3 mm, with a globular gland between the lower most leaflets. Inflorescence supra-axillary racemes, rachis few flowered. Sepals lanceolate, 5 - 8 × 1 - 2 mm, minutely pubescent, reflexed at apex. Petals yellow, broadly obovate, 4 - 5 × 4 - 5 mm. Stamens 5, filaments 3 - 4 mm. Pods linear-elliptic, compressed, 2 - 4 cm long, finely pubescent.

Fl. & Fr.: August - November.

Distribution: Common in the sub-tropical forest; 500 - 2100 m.

Specimens examined: Tirap District: Negnu-Niusa, G.Panigrahi 14892 (ASSAM); West Kameng District: Dum, J.Joseph 40074 (ASSAM); Lower Subansiri District: Yachuli, G.Panigrahi 19722 (ASSAM).

Notes: The species is very much similar to *Cassia mimosoides* L. and can be differentiated by few minor morphological characters viz., shorter stem height, longer leaves and presence of four stamens. The species is common in the warmer parts of the country including the adjacent phyto geographical regions viz., Assam, Sikkim and Bhutan. The present report forms the basis of the first report of occurrence of species in Arunachal Pradesh.

5. *Crotalaria anagyroides* Kunth in HBK., Nov.Gen.Sp. 6: 404.1823; Balakr., Fl. Jowai 1: 150.1981. (Leguminosae: Papilionoideae).

Shrubs, 1 - 5 m high, profusely branched from the base. Leaves 3 foliolate; petioles 3 - 7 cm long; leaflets ovate-lanceolate or oblong-lanceolate, 2 - 7 × 0.5 - 2.5 cm, base cuneate, entire, apex acute and mucronate, glabrous above, sparsely puberulous beneath, lateral veins conspicuous; petiolules 2 - 4 cm long, stipules linear, setaceous, 4 - 6 mm long. Inflorescence dense terminal racemes; peduncles 10 - 30 cm long, bracts linear, 8 - 13 mm long; pedicels 7 - 10 mm long, puberulous. Calyx 5 lobed, pubescent, sepals lanceolate. Petals bright yellow, standard obovate, with conspicuous red stripes; keel upcurved. Pods oblong, 2 - 4 × 0.5 - 1.5 cm, brown when ripe, glabrescent, turgid, with persistent curved style.

Fl. & Fr.: July - October.

Distribution: Scattered in the village outskirts and open waste lands; 400 - 1200 m.

Specimen examined: Kurung Kumey District: Deed, *S.S.Dash* 31123 (ARUN).

Notes: *Crotalaria anagyroides* Kunth is a native species of tropical America reported to be naturalized in Meghalaya and Mizoram. The turgid fruit with a persistent curved style easily distinguishes this species from the other species of *Crotalaria*. The plant species collected from Deed of Arunachal Pradesh is apparently migrated from the neighboring state and forms the basis of first report of occurrence of the species in Arunachal Pradesh.

6. *Crotalaria humifuga* Graham ex Benth. in Hook., London. J. Bot. 2: 476. 1843. (Leguminosae-Papilionoideae).

Herbs, prostrate with spreading stems, 25 - 30 cm high, appressed brown pubescent. Leaves oblong-elliptic, 1.5 - 3 × 1 - 2 cm, base rounded, margin entire, apex obtuse or acute, mucronate, membranous, sparsely brown pubescent above, glaucous beneath; stipules subulate, 4 - 6 mm long, apex acuminate. Inflorescences racemose, rachis 4 - 5 cm long, 2 - 6-flowered, densely brown tomentose, pedicels 5 - 6 mm long, silky. Calyx 5 - 6 mm long, densely pubescent with brownish hairs. Petals yellowish, standard obovate, 4 - 5 mm across. Pods oblong glabrous, 5 - 6 mm long, 6 - 8 seeded.

Fl. & Fr.: September - December.

Distribution: Common on open grassy river banks, fallow cultivated fields, 1200 - 1800 m.

Specimen examined: Lohit valley, Kingdon Ward 76 (ASSAM).

Notes: *Crotalaria humifuga* Graham ex Benth. is one of the most uncommon species of *Crotalaria* in Arunachal Pradesh. In fact, four specimens collected by Kingdon Ward from Lohit are the only authenticate specimens from Arunachal Pradesh. *Crotalaria humifuga* Graham ex Benth. is morphologically allied to *Crotalaria ferruginea* Graham but differs by more prostrate form, presence of elliptic-obovate leaves, obtuse and mucronate leaf apex.

7. *Dalbergia thomsonii* Benth., in J. Linn. Soc. Bot. 4 (Suppl.): 33.1860; Baker in Hook. f., Fl. Brit. India 2: 236. 1876. *Amerimnon thomsonii* (Benth.) Kuntze, Rev. Gen. Pl. 1: 159.1891. (Leguminosae-Papilionoideae).

Large woody climbers. Stem glabrous; branchlets lenticellate. Leaves 10 - 15 cm long, petioles terete; leaflets imparipinnate, oblong-elliptic or elliptic, 2 - 3.5 × 1 - 2 cm, glabrous on both surfaces, base cuneate or rounded, margins entire, apex emarginate; lateral veins 7 - 8 pairs, prominent beneath; petioles 3 - 4 mm long, terete; stipules 4 - 5 cm long. Inflorescence in axillary and terminal panicles, corymbose at first; branches ascending and ultimate becoming scorpioid. Flowers deciduous; bracts acuminate. Calyx minutely pubescent, unequally 5-lobed; upper 2-lobed, rounded at apex, connate at base; lower 3-lobed. Petals pinkish-white; standard suborbicular or elliptic-obovate, 7 - 10 × 5 - 8 mm, emarginate at apex; wings oblong; keels boat shaped. Anther filaments unequal, connate with a sheath at base. Pods greenish, narrowed at base, strap shaped, 5 - 10 × 2.5 - 4 cm, indehiscent, glabrous. Seed 1.

Fl. & Fr.: July - January.

Distribution: Rarely found in the primary dense forest; 400 - 1200 m.

Specimens examined: Kurung Kumey District: Kurung river to Yangtey, *S.S.Dash* 32834 (ARUN); Lower Subansiri District, Yazali, *G.D.Pal* 1265 (ARUN); West Siang District: On way to Kane Wild life Sanctuary, *S.S.Dash* 32280 (ARUN).

Notes: *Dalbergia thomsonii* Benth. is endemic to Assam, Meghalaya and Tripura (Kumar & Sane, 2003). This species was first collected from Arunachal Pradesh by G.D.Pal from Yazali of Lower Subansiri district and wrongly been identified as *Dalbergia assamica* Benth. [synonym of *Dalbergia lanceolaria* L.f. var. *assamica* (Benth.) Thoth.]. The species was again collected by the author from subtropical primary forests of Kurung Kumey and West-Siang districts. *Dalbergia thomsonii* Benth. can be differentiated from the other climbing species of genus *Dalbergia* of Arunachal Pradesh by the presence of emarginate elliptic leaves, axillary and terminal paniced inflorescence which are initially corymbose and later becoming ascending scorpioid.

8. **Derris marginata** (Roxb.) Benth. in Miq., Pl. Jungh. 252. 1825; Baker in Hook. f., Fl. Brit. India 2: 245. 1876; Kanjilal & al, in Fl. Assam 2 : 112. 1838. *Dalbergia marginata* Roxb., Fl. Ind. 3: 230. 1832. (Leguminosae-Papilionoideae).

Evergreen climbers, young branches lenticellate. Leaves 12 - 25 cm long; leaflets imparipinnate 5 - 7, oblong, lanceolate or elliptic, 7.5 - 15 × 2.5 - 5 cm, base rounded, entire, apex acuminate, glabrous above. Inflorescence lax flowered panicles; bracteolate 10 mm long; calyx campanulate, petals reddish. Pods oblong or oblong-lanceolate, 10 - 16 × 3 - 3.5 cm, narrowed at both end, finely reticulate, broadly winged along both suture.

Fl. & Fr.: April - November.

Distribution: Found in the tropical dense forests; 300 - 500m.

Specimens examined: Papumpare District: Gohpur to Chimpu, G.D.Pal 6387 (ARUN); East Siang District: Pashihat, R.N.Dey 19312 (ASSAM).

Notes: *Derris marginata* (Roxb.) Benth. has been reported elsewhere from Assam, Meghalaya, Sikkim, West Bengal, Bangladesh and Myanmar. Though the species was collected by R.N.Dey from Pashihat, but the occurrence has not been reported from Arunachal Pradesh.

9. **Desmodium laxiflorum** DC., Ann. Sci. Nat. Paris 4: 100. (Jan.) 1825; Baker in Hook. f., Fl. Brit. India 2: 164. 1876. Ohashi in Gingoana 1: 101.t.12.1973. (Leguminosae-Papilionoideae).

Erect shrubs up to 1.5m high, older stems striate, young branches rounded, densely hairy. Leaves 3-foliolate, 6 - 12 cm long; leaflets ovate or ovate-lanceolate, terminal leaflets larger, 3.5 - 10.5 × 2.5 - 3 cm long, base rounded, entire, apex acute or narrowly acuminate, glabrous above, minutely appressed tomentose beneath, lateral veins 5 - 7 pairs, petiolules 0.5 - 1.7 cm long, tomentose; stipules ca 1 cm, linear, acuminate, ciliate at margin. Inflorescence axillary and terminal racemes, 14 - 30 cm long, densely hairy with minute hairs, flowers pink or mauve, pedicels hirsute, c. 5 mm long, elongated in fruits, bracts c. 2 mm, deltoid, densely pubescent. Calyx 2 - 3 mm long, 4 lobed, lateral lobes elongated and minutely bifid at apex, densely hairy. Petals pink or mauve, standard 4 - 6 × 1 - 3 mm, base cuneate, apex rounded. Pods 2 - 5 cm, densely hairy with minutely hooked hairs, shallowly indented along both the sutures, 6 - 12 segmented.

Fl. & Fr.: September - October.

Distribution: Common in sub-tropical forest margins and degraded forests; 400 - 700m.

Specimens examined: Upper Siang District: West of Tuting, R.S.Rao 17323 (ASSAM); West Siang District: On way to Kanc, S.S.Dash 32029 (ARUN); Kurung Kumey District: Palin to Amjee, S.S.Dash 32649 (ARUN); Lohit District: Shoeliang-Dreyi, R.S.Rao 10883 (ASSAM); West Kameng District: Bhallukpong, J.Joseph 39803 (ASSAM).

Notes: *Desmodium laxiflorum* DC. is one of the most commonly growing species of *Desmodium* in subtropical Himalayas. Though, the species is common in Arunachal Pradesh but the occurrence of this species has not been reported for the state.

10. **Desmodium zonatum** Miq., Fl. Ind. Bot. 1. 1: 250. 1855; van Meeuwen, Reinwardtia 6: 97. 1961. Sanjappa, Legumes of India 166. 1991. *Desmodium ormocarpoides* auct. non DC. 1825; Baker in Hook. f., Fl. Brit. India 2: 164. 1876. *Desmodium ormocarpoides* DC., var. *velutina* Prain, J. Asiat. Soc. Beng. 66: 142, 391. 1897. (Leguminosae- Papilionoideae).

Under shrubs, stem woody, slender, younger parts finely brown pubescent. Leaves 1-foliolate, ovate, 10-15 × 6-8 cm, base rounded, apex acute, coriaceous, glabrescent above, sparsely fulvous pubescent beneath; petioles 1-2.5 cm long. Inflorescence terminal racemes, rachis 15-25 cm long; flowers fascicled at distant position; bracts minute, 3-5 mm long, apex acuminate, setaceous; pedicels 6-9 mm; calyx 2-3 mm, finely pubescent, teeth deltoid. Pods pendulous, 7-10 cm long, 6-8 segmented, joints ribbed, densely hairy with minute hooked hairs, distantly constricted between seeds at both suture.

Fl. & Fr.: August - March.

Distribution: Rarely found in open forests; up to 800m.

Specimen examined: Aka hill, N.L.Bor 22051 (ASSAM).

Notes: The occurrence of *Desmodium zonatum* Miq. is also recorded elsewhere in Assam, Meghalaya and Nagaland (Sanjappa, 1991). The above mentioned specimen is the only known collection of the species from Arunachal Pradesh. The occurrence of the species has not been reported earlier from the state and the present report forms the basis for the first report of its distribution in Arunachal Pradesh.

11. *Erythrina arborescence* Roxb., Fl. Ind. 3: 256. 1832; Baker in Hook. f., Fl. Brit. India 2: 190. 1876. (Leguminosae-Papilionoideae).

Trees, 7 - 15 m high, trunk and branchlets with conical brown spines. Leaves up to 40 cm long; leaflets rhomboid or ovate, 15 - 20 × 12 - 16 cm, base rounded or shallowly cordate, margin entire, apex acuminate, glabrous above, densely pubescent beneath, petioles 10 - 20 cm, with recurved small spines; stipules lanceolate, apex acuminate, deciduous. Inflorescence axillary racemes, peduncles stout, up to 30 cm long. Calyx deeply divided into 5 sub-equal lobes, 7 - 10 mm long, sparsely brown pubescent. Petals purplish, standard ovate-elliptic, 3 - 5 × 1.5 - 2 cm; wing oblong, 10 - 12 × 3 - 5 mm; keel triangular, often purplish marked. Pods oblong or ellipsoid 15 - 20 × 2 - 2.5 cm; shallowly constricted between seeds, seeds 4 - 5, black.

Fl. & Fr.: June - August.

Distrib: Scattered in the broad leaved forests; 1500 - 2100 m.

Specimens examined: Kurung Kumey District: Palin, S.S.Dash 31124 (ARUN); West Kameng District: Bomdila to Dirang, J.Joseph 40057 (ASSAM); Sheragaon to Jigaon, G.Panigrahi 15927 (ASSAM).

Notes: The occurrence of *Erythrina arborescence* Roxb. has not been reported earlier from Arunachal Pradesh. The species is similar to *Erythrina stricta* Roxb, but differs by the absence of spatheous calyx, presence of recurved spines on the trunk and flowering appears after leaf. The species is reported to be used in traditional health systems. Leaf paste of this plant mixed with kerosene is applied externally on and around wounds of cattle and other domestic animals also to get rid of flies. Most importantly it is a very good fodder in the entire eastern Himalayas.

12. *Flemingia involucrata* Benth. in Miq., Pl. Jungh. 246. 1852; Baker in Hook. f., Fl. Brit. India 2: 229. 1876. *Lespedeza involucrata* Wall., Cat. 5742. 1831 32, *nom nud.* *Flemingia capitata* Zoll. ex. Miq., Fl. Ind. Bat. 1,1:166.1855. *Moghania involucrata* (Wall. ex Benth.) Kuntze, Rev. Gen. Pl 1: 199.189. (Leguminosae-Papilionoideae).

Erect shrubs, 0.7 - 1.2 m high, stem terete, zigzag, younger branches downy pubescent. Leaves 3-foliolate, leaflets elliptic or oblong elliptic, 5 - 8 × 1 - 3 cm, base oblique or cuneate, entire, apex acute, glabrescent above, sparsely pubescent and glandular beneath, lateral veins 10 - 15 pairs; petioles 1 - 2 cm, stipules lanceolate, 5 - 6 mm, early deciduous. Flowers in axillary and terminal globose heads, heads 2 - 3 cm across, concealed by ovate-lanceolate bracts, bracts acuminate and setaceous at apex, ciliate along margin, 1 - 2 × 0.5 - 0.8 cm; calyx 3 - 5 mm, densely grey-pubescent, tooth lanceolate, 8 - 10 mm long; petals pink, standard oblong or elliptic, 8 - 10 × 3 - 4 mm, wing oblanceolate; keel oblique, upcurved. Pods ovoid, blackish.

Fl. & Fr.: October - March.

Distrib: Rarely found in the foot hills; up to 500m.

Specimen examined: Aka hills, N.L.Bor 22055 (ASSAM).

Notes: Chowdhery & al., (1996) reported only two species of *Flemingia*; viz. *Flemingia macrophylla* (Willd.) Merr. and *Flemingia strobilifera* (L.) Aiton. While examining at ASSAM herbarium the author found one specimen of *Flemingia involucrata* Benth. collected by N.L.Bor during 1938 from Aka hills of Arunachal Pradesh. Literature scrutiny (Sanjappa, 1991; Chowdhery & al., 1996) revealed that, distribution of this species has not been recorded for Arunachal Pradesh. *Flemingia involucrata* Benth. can easily be recognised from other members of *Flemingia* by the presence of congested axillary flowering heads with persistent brownish bracts.

- 13. *Hylodesmum podocarpum*** (Candolle) H. Ohashi & R.R. Mill, Edinburgh J. Bot. 57: 181. 2000; Huang & Ohashi in Fl. China 10:281.2010. *Desmodium podocarpum* Candolle, Ann. Sci. Nat. (Paris) 4: 102. 1825; Baker in Hook. f., Fl. Brit. India 2: 165. 1876.

subsp. **podocarpum**

Erect herbs, 60 - 120 cm high, stem brown pubescent. Leaves 3-foliolate, terminal leaflet broadly obovate or oblong, 3 - 9 × 3 - 5 cm, base broadly cuneate, entire, apex obtuse or acuminate, glabrescent on both surfaces; mid-veins reaching to the margin; lateral leaflets smaller; stipules linear-lanceolate, 5 - 7 mm long; petiole up to 7.5 cm long. Inflorescence axillary and terminal raceme, rachis 20 - 30 cm long; bracts minute, linear; pedicel 4 - 5 mm long. Calyx c. 1.5 mm long, minutely pubescent, teeth shorter than the tube. Petals white or purplish, standard broadly obovate or orbicular, 2 - 4 mm across. Pods compressed, stipitate, shallowly indented along the lower suture, segments 1, rounded, upper suture with a depression.

Fl. & Fr.: July. September.

Distribution: Rarely found in the secondary forest margins; as undergrowth in broad leaved mixed forests; 1500 - 2400 m.

Specimens examined: Kurung Kumey District: Sarlee to Satey village, S.S. Dash 31435; West Kameng District: Dum to Sella, J. Joseph 40298 (ASSAM); Tirap District: Tinha to Lajo, G. Panigrahi 14660 (ASSAM).

Notes: *Hylodesmum podocarpum* (Candolle) H. Ohashi & R.R. Mill, can easily be recognized in the field by its large terminal leaflets and two segmented fruits. This is the first report of occurrence of this species in Arunachal Pradesh.

- 14. *Indigofera pseudo-reticulata*** Grierson & D.G. Long, Notes R.B.G. Edinb. 37: 345. 1979. (Leguminosae-Papilionoideae).

Erect shrubs, up to 2 m high, younger parts sparsely brown pubescent, stem trailing or prostrate. Leaves 2 - 5 cm long, leaflets imparipinnate, 9 - 15, elliptic or oblong, 5 - 12 × 3 - 6 mm, base cuneate, entire, apex obtuse, mucronate, appressed pubescent on both surfaces; stipules acuminate, 2 - 3 mm long. Inflorescence axillary racemes, flowers congested on the upper half of the peduncles; bracts lanceolate. Calyx deeply divided up to base, teeth lanceolate. Petals pink, standard ovate, obtuse at apex, 6 - 8 × 2 - 4 mm, wings 7 - 8 mm long, exserted. Pods turgid, 4 - 5 cm long.

Fl. & Fr.: June - August.

Distribution: Common in the sub-tropical and temperate forest margins; along rocky and grassy river banks; 2000 - 2700 m.

Specimens examined: West Kameng District: Salari forests, J. Joseph 39987 (ASSAM); s.l., M. Rummy, 16620 (ASSAM).

Notes: Though Sanjappa (1991) recorded the occurrence of *Indigofera pseudo-reticulata* Grierson & Long in Arunachal Pradesh, Chowdhery & al., (1996) have not recorded in materials for the Flora of Arunachal Pradesh. The species being very uncommon often needs to be recollected. This present report confirms its occurrence (Sanjappa, 1991) in Arunachal Pradesh.

- 15. *Mucuna imbricata*** DC. ex Baker in Hook. f., Fl. Brit. India 2: 185. 1876. *Carpopogon imbricatum* Roxb., Hort. Beng. 54.1814; *nom. nud.*; *Stizolobium imbricatum* (DC. ex Baker) Kuntze, Rev. Gen. Pl 1: 208.1891. (Leguminosae-Papilionoideae)

Large woody climbers, bark grayish brown, younger parts sparsely pubescent. Leaves 3 foliolate; leaflets ovate or rhombic, 10 - 25 × 4 - 15 cm, base truncate or rounded, entire, apex acute and mucronate, glabrescent above, finely brown sericeous beneath; petioles 6 - 7 mm long. Inflorescence terminal or axillary racemes, rachis 6 - 30 cm long; bracts broadly ovate, persistent. Calyx broad campanulate, tube 1 - 2 cm long, lobes deltoid, densely covered with irritating brown bristles. Petals purple or whitish, standard 3 - 3.5 × 2 - 2.5 cm, keel abruptly deflexed at apex; 5 - 5.5 cm long. Pods woody, oblong or oblong elliptic; valves covered with oblique pairs or lamellae; both the sutures winged by 1 cm broad, densely covered with ferruginous irritant bristles, seeds 2-3, discoid, purplish.

Fl. & Fr.: August March.

Distribution: Rarely found in the tropical and sub-tropical primary forests, along river bank or moist localities; 500 - 900 m.

Specimens examined: Lohit District: Chowchen to Kherum, *J. Joseph* 48346 (ASSAM); Tezu, *A.S Rao* 47922 (ASSAM); Tirap District: Jairampur, *R.S Rao* 47922 (ASSAM).

Notes: The species is similar to *Mucuna nigricans* (Lour.) Steud. which is commonly found in north-east region of our country. Due to their close morphological similarity, either of the species is often overlooked by plant collectors, unless both the species are in fruiting condition. *Mucuna imbricata* Baker can be differentiated by the presence of T or Y shaped lamellae that are interrupted by a mid line leaving a narrow gap between each line, while in *Mucuna nigricans* (Lour.) Steud. lamellae remain continuous throughout the fruit. While examining the specimens at ASSAM, it was found that, the above cited specimens were kept under the *Mucuna nigraicans* (Lour.) Steud. No report of its occurrence in Arunachal Pradesh is available, except by a referral term as tropical Himalayas (Sanjappa 1991). This present report confirms the occurrence of the species in Arunachal Pradesh.

16. *Shuteria involucrata* (Wall.) Wight & Arn. Prod. 207.1834; Prain, J. Asiat.Soc. Beng. 66. 403.1897.

Glycine involucrata Wall., Pl. Asiat. Rar. 3: 22.t. 241.1832. *Shuteria vestita* Wight & Arn. var. *involucrata* (Wall.) Baker in Hook.f., Fl. Brit. India 2 : 182.1876. (Leguminosae-Papilionoideae).

Herbaceous climbers, stem glabrescent. Leaves 3-foliolate; leaflets elliptic-oblong, 1 - 5 × 0.7 - 3 cm, base rounded or acute, margin entire, apex obtuse and mucronate, glabrous above, minutely appressed pubescent beneath; petiole 1 - 5 cm long, glabrescent; stipules lanceolate, 5 - 8 mm long, glabrous; petiolule 2 - 3 mm long. Inflorescence axillary raceme, rachis 4 - 8 cm long, laxly flowered, bracts paired, upper bracts narrowly lanceolate, 4 - 5 mm long, lower bracts foliaceous. Calyx, 3 - 5 mm long, densely white sericous, lobes deltoid, 2 - 3 mm long. Petals greenish yellow, standard broadly ovate, 8 - 10 × 4 - 6 mm, wings oblong, keel up-curved. Pods linear, compressed, rusty pubescent, 4 - 6 seeded.

Fl. & Fr.: July - January.

Distribution: Rare in secondary forest, river sides and open fallow lands; 1200 - 2000 m.

Specimen examined: Kurung Kumey District: Sarlee to Milli, *S.S.Dash* 31063 (ARUN).

Notes: *Shuteria involucrata* (Wall.) Wight & Arn. is commonly distributed in the north and north-west India, Pakistan, Nepal, Bhutan and south east China, but has not been reported from Arunachal Pradesh. The present collection forms the basis of first report of its occurrence in Arunachal Pradesh. *Shuteria involucrata* (Wall.) Wight & Arn. can be separated from its allied species *Shuteria vestita* (Wall.) Wight & Arn. by the presence of dense flowered inflorescence, inconspicuous bract at the base of the pedicles of the Inflorescence.

17. *Trifolium repens* L., Sp. Pl. 767.1753; Baker in Hook. f., Fl. Brit. India 2: 86. 1876. (Leguminosae-Papilionoideae)

Annual or perennial herbs, stem creeping, rooting at nodes. Leaves 3 foliolate; leaflets digitate, obovate or oblanceolate, 1 - 3 × 0.5 - 2 cm; base cuncate, finely dentate along the margin, apex rounded and emarginated, finely denticulate along margin; glabrous, usually with a V shaped whitish blotch on upper surface; petioles 5 - 15 cm long; stipules membranous, lanceolate, acuminate. Inflorescence globular heads, rachis 10 - 25 cm long, head 2 - 2.5 cm across, densely flowered, pedicles 2 - 4 mm. Calyx 5 toothed, upper lobes longer, lobes lanceolate, 2 - 3 mm long. Petals whitish, standard narrowly obovate, 7 - 10 mm across, keel straight, adnate to the staminal tube, persistent. Pods oblong, 4 - 5 mm long, 3 - 4 seeded.

Fl. & Fr.: August March.

Distribution: Common in roadsides, fallow lands or in waste fields; 1200 - 2600 m.

Specimens examined: Tawang District: Tawang, Bipin Baloudi 10497 (ARUN); Lower Subansiri District : near Ziro, *S.S.Dash* 31776 (ARUN).

Notes: *Trifolium repens* L. is also known as the Shamrock or 'safed clover' It is commonly found in

the Himalayas and the Nilgiri hills down south. *Trifolium repens* L. and its allied species *Trifolium alexandrinum* L. is commonly cultivated in the other parts of countries for fodder. The occurrence of *Trifolium repens* L. has not been reported earlier in Arunachal Pradesh and this report forms the first report of the species in Arunachal Pradesh.

18. *Uraria lagopodioides* (L.) Desv., Mem. Soc. Linn. Paris 4:309.1826. *Hedysarum lagopodioides* L., Sp. Pl. 767.1753. *Hedysarum lagopoides* Burm. f., Fl. Ind. 68.6..53.f.2.1762. *Lespedeza lagopoides* Pers. Syn. Pl. 2: 318.1807. *Uraria lagopoides* (Burm.f.) DC. Prodr. 2: 324.1825; Baker in Hook. f., Fl. Brit. India 2: 156. 1876. (Leguminosae-Papilionoideae).

Herbs, stem prostrate, ascending, 30 – 70 cm high, younger parts soft brown pubescent. Leaves 3 - foliolate; leaflets oblong or oblong-elliptic, 2 - 6.5 × 0.5 - 4 cm; base rounded, apex slightly emarginated and mucronate, glabrous above, finely brown pubescent beneath; stipules lanceolate, apex acuminate. Flowers elongated racemes, peduncles 2 - 8 cm long, bract ovate, conspicuous, 8 - 10 × 2 - 5 mm, acuminate, persistent, distinctly ciliate at margin; pedicels densely hairy. Calyx 4 – 5 mm long, lower teeth elongated, setaceous, densely pubescent. Petals bluish, smaller than calyx, included. Pods oblong, segmented 2 – 3, elliptic, dark brown.

Fl. & Fr.: August - September.

Distribution: Scattered in the open areas, dry river banks; 1800 – 2200 m.

Specimen examined: Lohit District: Chowkham to Kherum, J. Joseph 48395 (ASSAM).

Notes: The species is reported to be distributed throughout the country including the NE states of Assam, Sikkim, Manipur (Sanjappa, 1991); but no collection was known to have been made from Arunachal Pradesh. The present report is the first report of its distribution in Arunachal Pradesh.

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अरुणाचल प्रदेश में कुछ लेग्युम जातियों की व्याप्ति पर नोट्स

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इस शोधपत्र में अरुणाचल प्रदेश में ध्यान देने योग्य व्याप्ति प्रणाली वाले लेग्युमिनॉसी कुल की 18 जातियों की व्याप्ति का विवरण है। एक्रोकार्पस फ्रेक्सिनिफोलिअस, सिजलपिनिया डिकेपेटेला, केसिआ होचेस्टेटी, क्रोटेलेरिया एनेगाइरॉयडिस, डलबर्जिसा थोम्पसोनी, डेस्मोडिअम जोनेटम, फ्लेमिंजिया इवोलुक्रेटा, हाइलोडेस्मम पोडोकार्पम का राज्य में प्रथम अभिलेख हुआ। एडेनेथेरा पेवोनिना, क्रोटेलेरिया ह्युनिफुगा, इरिथ्रिना आर्बोरेसेंस, इंडिगोफेरा स्युडोरेटिकुलेटा, डेरिस मार्जिनेटा, डेस्मोडिअम लोक्सिफ्लोरम, मुकुना इम्ब्रिकेटा, शुटेरिया इवोलुक्रेटा एवं ट्रिफोलिअम रेपेंस, यूरेरिया लेगोपोडिआइडिस की व्याप्ति निकटवर्ती राज्यों या वनस्पति भौगोलिक क्षेत्र से विस्तारित व्याप्ति के रूप में अभिलेखन हुआ।